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Physiological performance structure of male kho-kho players

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Abstract
The purpose of the study was to find out the relationship between selected physiological variables and playing ability of national level Kho-Kho Players. For the present study, researcher fifty (N=50) elite Kho-Kho players were randomly selected as subjects from the different district of west Bengal. All the subjects were in regular training schedule. The selected physiological measurements were taken with the help of different method. Resting heart rate was measured by pulse rate, blood pressure was measured by Sphygmomanometer, force vital capacity was measured by peak flow meter, and Vo2max was measured by Queens College step test. The performance of the subjects was measured by judges rating scale during the match. Product moment method for inter-correlation was applied for analysis of data. Resting heart rate, Systolic blood Pressure, Force vital capacity was significant with the performance in 0.05 levels. Diastolic blood pressure and Vo_2 max are significant with the performance in 0.01 levels. It can be concluded from the findings of the present study that heart rate, Systolic blood Pressure, Force vital capacity, Diastolic blood Pressure and Vo_2 max measurements contribute significantly in Kho-Kho performance.

Keywords: Physiological parameters, vo_2 max, Sphygmomanometer, Queens College step test, judges rating scale.

1. Introduction
Performance structure is the specific make up of performance in general and sports performance in specific with all the constituent factors. Performance structure of any sport is complex in nature with a very high number of influencing variables. It is complex because some of its components are dependent and some others external; some of them can be controlled but some of them are beyond control of the athlete, some are physical and some are physiological.

Kho-Kho is a game of speed, stamina, endurance, strength and skill. Dodging and controlled sprinting makes the game exciting. Kho-Kho is a game of the participants` physical fitness, strength, speed and stamina and dodging ability. As the level of performance increases the players attains high degree of physical fitness. Peter and Haliski (1950) [13] supported this view that the successful participation in any game is directly related to physical fitness. Bernard (1966) reported that physical fitness improves in those who take regular physical exercises. Regular participation in games significantly contributes to higher level of performance and greater degree of physical fitness amongst the players. Bosco (1975) [13] found a low heart rate among champion gymnasts. Low heart rate is the outcome of a good endurance and a symbol of high degree of fitness.

The contents of sports performance structure consists of individual key areas which are called components of performance structure.

- Physical component is generally focused on developing motor abilities.
- Technical component focuses on acquiring sports skills through motor learning.
- Tactical component focuses on acquiring and further development of different ways to conduct sports contest on a purposeful basis.
- Physiological component is focused on improving the athlete's total performance during competition.

For the present study researcher delimited the study on Physiological component.

1.1 Objective of the Study

- To study the physical parameters (viz. height, weight) of national level Kho-Kho players.
- To study the physiological profile of national level Kho-Kho players in detail.
- To study the impact of the physiological variables (i.e. Resting Heart Rate, Blood pressure -systolic & diastolic both in resting condition, Force vital capacity and Vo2 max) on kho- kho performance.

2. Methodology

2.1 Selection of Subjects

A total of fifty (50) male state level elite Kho-Kho players were selected as subjects for this study. All the subjects were active Kho-Kho players and used to practice regularly under the direction and supervision of qualified coaches. They were also bonafide Kho-Kho players of state level Kho-Kho game. They were in the age group of 15 to 23 years.

2.2 Methods were used for measuring Physical parameter

Sl. No.	Physical parameters	Use of tools	Unit of measurements
1	Age	from their date of birth	Years
2	Height	using anthropometric rod adopting standard procedure	cm
3	Weight	Using Weighing Machine	Kg

2.3 Methods were used for measuring Physiological parameter

S l. no.	Physiological parameters	Test Items tools	Unit of Measurement
1	Heart rate	Pulse Rate	beats / min
2	Blood Pressure	Sphygmomanometer	mm of hg
3	Force Vital Capacity	Peak Flow Meter	ml / min
4	Vo2 max	Queens college step test	ml/ kg /min

2.4 Measuring Kho-Kho playing Ability

Kho-Kho playing ability was measuring by Judges rating Scales.

2.5 Statistical analysis

To determine the relationships, Pearson's Product moment method for inter-correlation was applied and the alpha level was set at 0.05.

3. Results and Discussion

The results of the study are given below in the following Tables

Table 1: Mean and Standard deviation of the Physiological Profile and Kho- Kho playing ability of the subjects (N= 50)

SL. No.	Parameters	Mean	Standard Deviatation
1.	Resting Heart Rate	65.44	±1.94
2.	Systolic blood Pressure	122.36	±4.411
3.	Diastolic Blood Pressure	71.24	±8.28
4.	Force vital capacity	707.7	±81.973
5.	Vo2 max	43.758	±1.934
6.	Kho-Kho playing ability	56.8	±3.521

From the Table no. I, it was found that the mean Heart Rate of the selected Kho-Kho players was 65.44 beats/min with SD of 1.94 beats/min, mean Systolic Blood Pressure of the selected Kho-Kho players was 122.36 mm of hg and SD of 4.11 mm of hg. , mean Diastolic Blood Pressure of the selected Kho-Kho players was 71.24 mm of hg and SD of 8.28 mm of hg. Mean force vital capacity of the selected Kho-Kho players was 707.7 ml/min with SD of 81.973ml/min. Mean Vo2 max of the selected Kho-Kho players was 43.758 ml/kg/min with SD of 1.934.

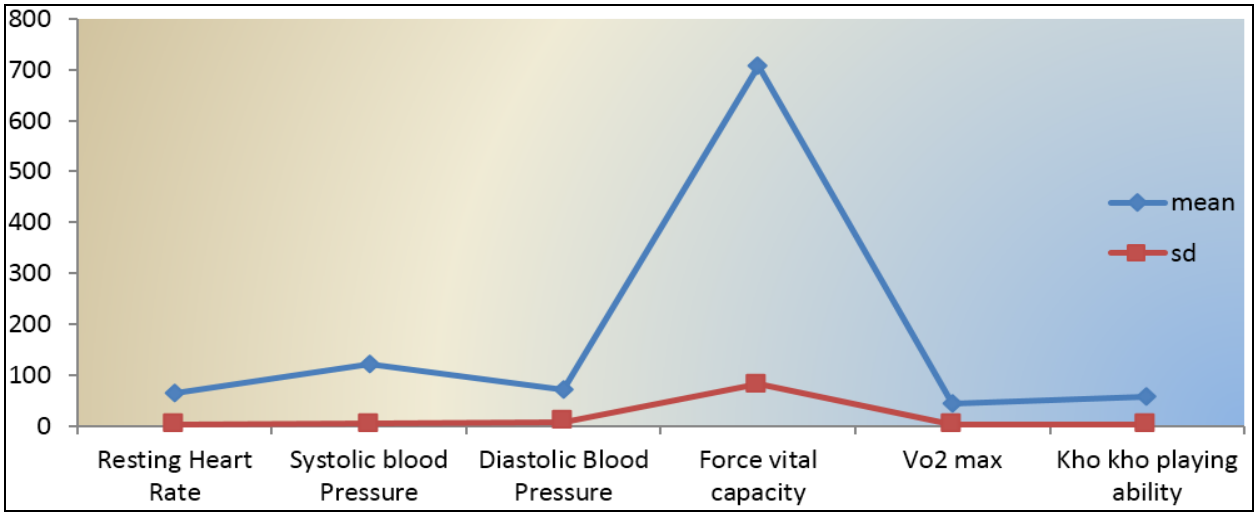

Fig 1: Graphical presentation of Mean and S.D of the Physiological Profile and kho- kho playing ability of the subjects (N= 50)

With the knowledge of mean values of selected, physiological parameters, the co-efficient of correlation between performance ability and the selected physiological parameters were computed. Table -6 shows the results.

Table 2: Coefficient of correlation between performance ability and the physiological parameters

SL. No.	Parameters	Co-relation with Playing Ability
1.	Resting Heart Rate	0.27*
2.	Systolic blood Pressure	0.283*
3.	Diastolic Blood Pressure	0.566**
4.	Force vital capacity	0.262*
5.	Vo2 max	0.503**

*Significant at 0.05 level **Significant at 0.01 level

The coefficient of correlation between playing ability and heart Rate was .27. The coefficient of correlation between playing ability and Systolic Blood Pressure was – 0.283. The correlation between playing ability and Diastolic Blood Pressure was - 0.566. The correlation between playing ability and Force vital capacity was 0.262. The correlation between playing ability and vo2 max was 0.503.

4. Discussion

The results of the study clearly show that the kho- kho plying ability is significantly and positively related to the physiological parameters. Out of five physiological parameters Diastolic Blood Pressure and Vo_2 max are significant in 0.01 levels. Resting Heart Rate, Systolic blood Pressure, Force vital capacity was significant in 0.05 levels. Positive and significant force vital capacity and Vo_2 max indicates the goodness of energy liberation system which is very much useful for performance in Kho-Kho. Whereas Positive and significant lowering of resting heart rate indicate the efficient heart (Athletic heart) i.e. accelerate and decelerate the speed quickly. Positive and significant increment of Diastolic and Systolic blood Pressure during playing situation indicate more blood supply to the active muscle; which is very necessary for good performance. The findings of the study are in complete agreement with the results of the earlier studies reported by Brooks, Fahey and White (1996) that systolic blood pressure rises steadily during exercise, in a similar trend to that of heart rate.

5. Conclusion

Majority of the researcher show that in many of the games, playing ability has close relationship between physical and physiological component. Kho-Kho players having higher Vo_2 max, be the good performer in Kho-Kho game as these qualities are the good predictors of Kho-Kho skills. Average and low status are unsuitable for the game.

Kho- Kho players are found to be more endurance and powerful. National level players have greater physical and physiological abilities. There is interrelationship between physiological and playing ability.

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